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1993

 Faculteit der Economische Wetenschappen en Econometrie

1993
067

Serie Research Memoranda

Private Sector Involvement In Financing Transport Infrastructure: a Historical Sketch, Current Practice and Some Lessons

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Research Memorandum 1993-67

December 1993

vrije Universiteit *amsterdam*

PRIVATE SECTOR INVOLVEMENT IN FINANCING TRANSPORT INFRASTRUCTURE: A HISTORICAL SKETCH, CURRENT PRACTICE AND SOME LESSONS

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Abstract

The key role of transport infrastructure in the emerging European network has provoked many questions as to the financing of new infrastructure. In the course of the twentieth century governments in all countries have assumed responsibility for financing transport infrastructure. In the past decade, however, serious doubts have been expressed on the efficiency of a strong public financial involvement in infrastructure.

The paper addresses the question whether infrastructure financing is a necessary competence of governments. It appears that in the past century the private sector has had a much stronger position in providing financial resources for infrastructure involvement. Therefore, the necessity for government financing is a stake in the current debate.

In the paper several arguments pro and contra public financing are systemically evaluated and illustrated by various uses related to various modes of transport. The conclusion is that there is much scope for the private sector in financing new transport infrastructure in Europe.

1. Introduction

Transportation lies at the heart of the spatial-economic evolution of our economics. The development of the transport sector -and spatial interaction in general- mirrors the socio-economic, spatial and political dynamics of our societies. In the **sixties**, a period with unprecedented economic growth in Western countries, transportation policy was strongly orientated toward network and capacity expansion. From the **seventies** however, the limits to growth discussion marked a more modest role of infrastructure policy in which a more efficient use of existing networks received more attention than a straightforward physical expansion. In the **eighties** new views have come to the fore, reflected inter alia in the environmentalist movement (green parties, e.g.) with its strong concern about the negative impacts of infrastructure on the general quality of life. From the **nineties** onward also strong interest in the potential of modern technologies (telecommunication, e.g.) for network improvement emerged, notably in the context of the missing networks discussion and of the evolving new network economies (see: Nijkamp and Blaas, 1993).

These stages of transportation planning have also provoked shifts in scientific interest. Research in transportation planning has in the past decades devoted much attention to demand analysis, e.g. mode choice, route choice etc. Especially the behaviourial models in transport research dealt mainly with the demand side. The **supply** side has received far less attention, especially in a modelling context (cf. Rietveld and Boonstra, 1993).

However, in recent years the profound changes in economic and spatial policy have brought about a **re-orientation** in transportation with a clear focus on supply-driven mechanisms, in which the role of the public sector is increasingly at stake. Many societies all over the world seem to move to a new type of planning framework and culture, in which sometimes planning as a normative activity is even questioned (cf. Nijkamp, 1993). The trend towards market principles and liberalist views sketched by Fukuyama (1992) and mirrored against others in **devolution** principles such as deregulation, decentraliz-

ation and privatization leads to far reaching implications for public sector involvement in physical planning including infrastructure planning (see: Van Gent and Nijkamp, 1991).

This trend is reinforced by **various force-fields** such as public budget deficits in many countries, the need for more competiveness in (semi-)public goods delivery in order to enhance efficiency, the need for more customized service supply at a local (decentralized) level, and the drastic re-orientation in Eastern Europe where privatization is a sine qua non for bureaucratic inefficiencies, insufficient fiscal revenues and new equity and ownership considerations (cf. Kornai, 1992).

In view of the sky-rocketing mobility at the demand side and the strategic role of transport infrastructure as a critical success factor for competitive advantage and internalization at the supply side, transport policy deserves full scale attention. The positive externalities of transport networks run the risk to be overruled by negative externalities in the form of pollution, congestion and lack of safety. As a result, **various types of government interventions** (initiating, regulatory, financial or market-oriented) have emerged. However, the high costs of modern transport infrastructure in all modes have at the same time put a unbearable burden on the government budget, so that the debate has started on **private financing** of infrastructure, based e.g. on 'user charge' principles. Thus, in our era transportation planning requires a balanced implementation of actions which ensure a consideration of both private and social costs and benefits, and a network orientation which exceeds local or single-modal policy interests.

The present paper pays attention to flaws in private financing of transport infrastructure. The paper is organized as follows. Section 2 gives an overview of problems and opportunities in private sector involvement, in general as well as in the transport sector. Section 3 offers a multi-modal historical sketch of the history of infrastructure financing in the Netherlands. Next, in section 4 a concise cross-comparative European overview of different financing schemes for the same transport modes is provided. In a final section some considerations and lessons regarding private financing in the private sector are offered.

2: Public Sector Involvement: An Overview

In all market economies the role of the government is not absent, but is usually oriented towards various specific economic segments or the fulfilment of specific socio-economic objectives (cf. Fokkema and Nijkamp, 1993). Traditional welfare theory argues that social welfare can be maximized through market transactions based on a free exchange of perfectly operating markets. In that case government intervention -leading to a shift in 'laisser faire' behaviour- would negatively affect the Pareto-optimal outcome of a freely operating market. However, three conventional arguments are often used to justify government intervention under specific conditions:

- the **'infant industry' and 'infant region' argument**, where in an initial stage of industrial or regional development the economic basis of the industry or region is too weak to be competitive and to survive. This argument is often used to justify subsidies and protection to the transportation sector in less favoured regions, e.g. in the European Community.
- the **market imperfection** argument which takes for granted that a market system does not always result in a Pareto-efficient allocation. In practice, there are many cases of inertia, biased behaviour or lack of information which lead to so-called **market failures**, so that a Pareto-efficient allocation of resources is not achieved. The aim of government intervention is then to remedy this sub-optimal allocation. Thus the role of the government is to attain the theoretically pure situation of perfect competition. Well known causes of market failures are:

  * **imperfect competition**: this may evolve in case of indivisibilities or returns to scale (e.g., public utilities), where public monopolies may be necessary to serve the consumer's interest.

* **imperfect information**: in case of lack of (reliable) information (or of equal access to information), governments may issue regulations on product quality or liability in order to protect the less informed actors.

* **absence of markets**: examples are **externalities** (third-party effects outside the realm of market transactions, such as environmental damage) or **public goods** (non-excluding goods such as national defense, street lights etc.)

the **ethics and justice argument** which takes for granted the relevance of normative views on the functioning of the economy. This argument emerges if, in accordance with ethical or political belief of society or governments, outcomes of a market economy are regarded as **inequitable or unacceptable**. An example is a large socio-economic inequality to which the market system may lead, if not everybody has the same opportunities and talents to compete in a fair way. The government can then influence the distribution of incomes and wealth by, among other things, taxes, transfers, income policy (including a statutory regulation of minimum wage) or rent policy. An obvious case is discounted fares for children en elderly in public transport.

In addition, the government can hold the view that in some cases the consumer underestimates structurally the importance of some goods and services (**merit goods**). That is why sometimes the consumption is made compulsory (for example, helmets for motor cyclists) or goods are provided free of charge or at reduced price (for example, regional bus transport). It may also occur that the consumption of some goods should be decreased for everyone's own interest (**demerit goods**). This occurs, for instance, by imposing high taxes (for example, gasoline use) or by forbidding high consumption (for example, high travel speed).

Thus there is in the context of traditional welfare theory a wide range of motives for public interventions which would serve to achieve or restore a Pareto-efficient allocation. But at the same time it should be recognized that the good intentions of governments may have adverse effects. This is the case of so-called **government failures.**

These failures might result from imperfect insight in the real demand for public services, insufficient recognition of (positive and negative) effects of policies (that occur in the long run), or because public policies lead to bureaucracy and complicated and non-transparent legislation. So the government should always value its own possible failures against the 'market failures' they try to prevent or correct. If the government decides that these arguments are, given their specific situation, sufficient to intervene, the question of how a government policy should be shaped and in particular **financed** comes up. This issue is also of critical importance for current transportation policies in market societies (see: Blaas et al., 1993). An important obstacle to effective infrastructure planning in a competitive network economy is the lack of sufficient funds for financing advanced new network infrastructure, partly caused by lack of public funds, partly caused by lack of willingness of the private sector to set aside the necessary financial means. This might also lead to a delay in the construction of infrastructure. To reduce public deficits, the investment is then often spread out over a longer period of time than desirable. In the Netherlands the investments in the railway infrastructure, for instance, are planned until 2015. All those investments cover infrastructure improvements on routes already suffering from severe congestion and lack of capacity (in a qualitive or quantitative sense).

The financing of public infrastructure has traditionally been the responsibility of governments, in their role as both initiator and main financier of infrastructure. This has helped to create the major infrastructure networks in Europe. It is noteworthy, however, that investments in infrastructure show a strong decline in the last decades in most countries, because of a number of reasons, one of the most important ones being the lack of funds, since most governments are developing policies to reduce public deficits. Another major

cause is the change of financial priorities, where investments in infrastructure have to compete increasingly with expenses for other policies (including interest payments on public debts). Since in many cases user charges for infrastructure are not seen as a viable option, investments in infrastructure stay at their current, historically low, levels in most countries.

It should be recognized however, that the role of governments in financing transportation infrastructure -as an important public good- has not always been the same. For instance, in the nineteenth century a considerable part of major infrastructure projects (canals, railways, roads) were developed with the aid of private money. Only in our century it was realized that -mainly because of external and equity effects- infrastructure should be a major responsibility of governments. This has lead to a huge budget claim on public resources for infrastructure provisions. In the past years however, the insight has grown that it should not **a priori** be self-evident that all types of infrastructure would have to be financed by governments, certainly not in a situation of high public deficits. However financing of infrastructure by private sources implies that more attention is focused on the economic-commercial value of infrastructure.

When considering the history of private infrastructure financing it is interesting to notice, that private financing is also facing serious flaws. In the Netherlands, for instance, the first major investments in infrastructure -in the nineteenth century- where mostly undertaken by the King himself, since most private investments took place in the former colonies. This situation of lack of interest from the private sector has changed very little in recent years. The major cause for the behaviour of private financiers lies in the high risk-benefit ratio of this type of investment; the combination of high political risks and low or negative returns on investments in combination with a long pay back-period (mostly > 20 years) appears to discourage private investors (cf. Brealy and Myers, 1988; Copeland and Weston, 1988; Kharbanda and Stallworthy, 1983). Given the **uncertainty and risks involved in massive infrastructure investments** and given the **complex network character** of a transportation system, a strict division between public and private sector involvement cannot be made. This

point is clearly illustrated by Marcou (1993), who in an analysis of the role of public and private sectors in the Channel Tunnel venture came tot the conclusion that even a strict private financing by banks was surrounded and supported by a complex myriad of public regulations, interventions and public flanking policies (of a substantial financial size) which make even the possibility of a non-guarantee commitment for both the French and the UK government doubtful.

In any case, there is sufficient reason for a further investigation of the role of the private and public sector in the building up of European infrastructure. Therefore, in the next two sections a concise multi-modal picture of financing Europe's transport network will be given. Section 3 will depict the Dutch situation, while section 4 will offer a compact cross-comparative European overview.

3. Financing of Infrastructure: A Multi-Modal Picture of the Netherlands

In this section a short historical sketch of the ways various transport infrastructure modes in the Netherlands have been financed will be given (see also Rienstra, 1993). We will deal with waterways, railways and roads, respectively.

3.1 Waterways

Inland waterways have traditionally been one of the most important transport activities in the Netherlands. Not only the rivers, but also man-made canals formed an essential part of Dutch transport infrastructure. In particular, the horse drawn barges where important vehicles for both passengers and goods (see: De Vries, 1981). The construction of canals started already in the seventeenth century and continued until the beginning of this century.

The canals were mainly financed by the cities, connected by these waterways. These cities created special societies aiming at commercial use of the canals. This decentralized system was mainly based on a toll system, so that at the end the user had to pay for it. Given the high profitability of many canals, various cities were very keen on expanding the inland waterways system. The exploitation of the canals was usually a joint responsibility of shippers' associations (guilds). Until the nineteenth century the central government did not participate substantially in these canals. In the nineteenth century however, the central government started to finance the canals, which were also much bigger than those built before. Especially King Willem I was pushing the construction of these canals, which were sometimes even partly financed by his own private capital. In the twentieth century the central government became the financier of new infrastructure, the toll-systems were gradually abolished, and most small canals were closed.

3.2 Railways

Since 1830, the development of railways led to a new phase in the evolution of modern infrastructure in the Netherlands.

In the **first stage** (until 1860) all railways were developed on a private-commercial basis. Initially, even financial compensations were given to horse-drawn barges and carriages in order to reduce resistance of competing interest parties. Concessions for private exploitation were granted by the government.

In the **second stage** (1860-1890) the equity objective played a role. Various cities were not connected to the new railway infrastructure as such links were not commercially feasible. The development of the railways was also staying behind other European countries, where the construction of new railways was supported much more by the governments. Therefore, in this new stage the government took upon itself the responsibility to build expansions of the railway system for less profitable sections. The exploitation of these new links rested however still with private companies (sometimes subsidized by the government).

The **next stage** (1890-1948) meant a gradual integration of the segmented Dutch railway system, in order to benefit from the network synergy. At the end one national railway company (the Dutch Railways) was created which had a monopoly position, but at the same time also had a duty for exploitating and transport on all designated links of the network. This social equity objective meant in practice that it became almost impossible to operate the railway system on a commercial basis.

In the **post-war stage** the Dutch Railways participated also in regional bus transport. Gradually the company entered a stage of structural deficits which were covered by the government. Since 1985 the Dutch Railways have to operate with a fixed budget established annually a priori by the government. New infrastructure is financed à fonds perdu by the government, maintenance and depreciation are financed by the Dutch Railways. In recent years there is increasing pressure to have again a commercial exploitation of the railway system (including financing on the open capital market).

3.3 Roads

As mentioned above, horse drawn carriages and later on automobiles made up the main vehicles on road infrastructure. The strong competition between various types of transport led at the end to a winning position of the private car. The drastic expansion of road infrastructure parallelled this growth of private transport.

Drastic investments in road infrastructure started essentially at the beginning of this century. The government took the responsibility to finance road infrastructure, the revenues were mainly collected from road taxes, vehicle taxes and general taxes. Private financing of roads has never become a major activity; only a few bridges and tunnels have been privately financed and exploited, although in recent years there is an increasing tendency to expand the number of privately financed infrastructural options.

3.4 Concluding remarks

The formidable growth in mobility in the post-war period (see: Nijkamp et al., 1991) has not only caused a massive expansion of transport infrastructure, but also a selective growth of some modes (with private road transport as the absolute winner). Public financing of traditional modes (water-ways, railways) has hence been increased. The role of the government has been fluctuating between abstention, dominant involvements and encouragement of private initiatives. Apparently, the policy life cycle of infrastructure financing in the Netherlands is following the budget cycle. This means that the gradual decline of private infrastructural initiatives may soon turn into a greater impact of the private sector on financing and exploitation of various infrastructure modes.

4. A Cross-Comparative European Overview

In general, governments have a great impact on the development and financing of transport infrastructure, both directly and indirectly. The modes of financing appear to differ among different infrastructure modes. This also makes private financing a complicated matter, and as a result to the identification of an optimal structure of charges and of an optimal level of user charges is fraught with many difficulties. This does not only hold true for the Netherlands, but also for many other European countries, as will illustrated in this section on the basis of experiences from Denmark, France, Germany, Great-Britain, Sweden and Switzerland. In subsections 4.1 - 4.3 we will deal with inland waterways, railways and motorways respectively.

4.1 Waterways

Historically, the plans for the development of new major waterways such as the Suez Canal, the Panama Canal and the first Channel tunnel plans all resulted from private initiatives (see: Marcou, 1993), based on concession agreements with governments.

In Europe, waterways have lost a considerable part of their historical importance. Only in the triangle the Netherlands, Belgium and Germany -and to a lesser extent France and Switzerland- does inland waterways transport still play an important role, mainly as a result of the strategic importance of the river Rhine (see: Giaoutzi and Nijkamp, 1993).

According to the Mannheim Treaty (1869) priority treatments of national fleets and levies of user charges are prohibited, so that private initiatives for exploitation and maintenance do not seem possible. It is interesting however, how the division of freight over the various competing shippers runs via an auction system in order to cope with the problem of overcapacity.

The recent opening of the Rhine-Main-Danube Canal might in principle offer a new strategic link to East- and South-East Europe, although the current situation in former Yugo-Slavia precludes a profitable use of this

potentially important segment.

It turns out that almost all waterway infrastructure links have been -and are still- financed by governments. Despite the potential of waterways (cheap, huge capacity, environment-friendly, safe), this transport mode has a low priority in a European context, although in recent years organisations such as ECMT and EC have made a plea for revival of this mode of transport.

4.2 Railways

The development of the railway systems in Europe was in many countries the result of private initiatives and investments, at least in the beginning. A well known example is the development of Greek Railways by French companies. Nevertheless there was an active involvement of governments by providing concessions, by approving the fare systems, by providing the land, by executing complementary civil works and soon also the financing of infrastructure and subsidizing the companies. As a result of both public interest in isolated areas and the worsening competitive position of railroads, the state in the European countries became more and more involved, both financially and organisationally. In most countries this has led to national railway companies.

In **Great-Britain**, for instance, the railways were nationalized in 1946. But in the past decades the formidable losses of British Rail have forced decision makers to reorganise the company. At present, BR is subdivided into six business units or sectors, with a high degree of autonomy. Four of these sectors concern passenger transport, Intercity Passenger (commercially operated), Network Southeast (state subsidized), Regional Services (state subsidized) and European Passenger Services (to be operated on a commercial basis). Next, the two freight transport units, Trainload Freight and Rail Freight Distribution have to be run on a commercial basis. This re-organisation has led to a drastic reduction in transfers for deficits from the central government (£1.217 mln in 1983 as against £607 mln in 1989).

BR is also the owner of the infrastructure and has to maintain this according to market principles, so that also the above mentioned 6 business units have to pay for the use of these infrastructure services. So far BR is not free to borrow money on the open capital market, so that indirectly the government is still financially controlling BR.

The new **Swedish** railway infrastructure policy is interesting in that all costs (including external costs) have to be borne by the user, with a differentiation according fixed and variable costs, while favouring competition on certain links (see: Hansson and Nillson, 1991). For this purpose the Swedish Railways were subdivided in 1988 into two divisions, Statens Järnvägar (SJ) (in charge of the exploitation) and Banverket (BV) (in charge of the management of the infrastructure). The intercity and commodity transport section of SJ has to operate on a commercial basis. Non-profitable segments can be supported by the government. The regional network belongs to the competence of regional governments. These authorities may grant concessions for regional transport to either SJ or third parties. SJ itself may borrow capital on the market. The users of infrastructure (e.g. SJ or third parties) have to pay a remuneration to BV, supplemented with a subsidy of the government. In consequence, the influence of the public sector is still significant.

The Swiss railways are subdivided into the major company Schweizerische Bundesbahnen (SBB) and some 65 private links (which are less important, however). The accounting system of SBB is subdivided into 3 parts: a company account, an infrastructure account and an investment account. Depreciation and interest from the investment account are sluiced to the company and infrastructure account, so that administratively exploitation and management of infrastructure can be separated. SBB makes a distinction into commercial transport (long distance passenger and mainly freight transport) and non-commercial transport (mainly regional passenger transport). The Swiss government is still owner of the infrastructure and finances construction and maintenance. The commercial segments have to pay a user charge.

In **Germany** the Deutsche Bundesbahn (DB) has been granted the right to borrow money on the capital market (the loans are guaranteed by the government, however) in order to finance its own infrastructure. Partly as of exploitation losses DB has accumulated high debts, which at present have to be covered by the German government.

The same situation applies in **France** to SNCF, which also has to be supported by the French government.

Autonomous lending by railway companies on the capital market is not allowed in countries like Denmark, the Netherlands, Sweden and Switzerland, while also BR is forced to use public loans. The advantage of private money involvement in the railway sector is the incentive to efficiency increase, but a disadvantage is the loss of control of governments on major investments for strategic infrastructure, while governments might still have to guarantee the pay-back of loans.

The above mentioned distinction between **commercial and non-commercial sectors** seems meaningful, as it allows a useful distinction between different parts of the transport market (passenger vs. freight, regional vs. long distance), so that investment decisions and flows of subsidies can made more transparent.

The **separation of exploitation and management** of railway infrastructure is also an economically interesting idea, as then the financial flows between the governments and railway companies can be made much more visible. This is also important for the question of the level and structure of user charges.

4.3 Roads

The growth in car mobility is closely related with the development of road infrastructure in Europe. In many countries the road infrastructure has been publicly financed (often via a system of road taxes, vehicle taxes and fuel taxes). In some countries however, private initiatives have been used to finance motorway expansion, e.g. in France and Italy.

In **France** the backwardness of the motorway network in the sixties stimulated the French government to use a system of private concessions offered for bid in order to collect private capital investment. As a result, the system of French autoroutes emerged, which are essentially toll roads (cf. Marcou, 1993). These roads are financed by the Sociétés d' Economie Mixtes (SEM) as a joint venture of the French government and private parties. In case of failure, part of the debt is guaranteed by the state. The tariff structure is proposed by the SEM, but has to be approved by the government, which also remains the legal owner of the autoroutes.

Swedish road infrastructure policy takes for granted that road users should not only be charged for direct costs, but also for external costs (environment, accidents etc.). Such external costs were estimated to be 310% of the infrastructure costs (Hansson and Nilsson, 1991). Such a high charge has however, not yet been introduced. A state company, Vägverket (VV), owns the road infrastructure in Sweden; it is also responsible for road maintenance. New investments are evaluated by a cost-benefit analysis incorporating also external costs.

There is a **wide spectrum of financing mechanisms** for road infrastructure in various European countries. For instance, in France, Germany and Switzerland fuel taxes are also used to finance infrastructure. In practice various different financing modes are proposed for new infrastructure links. For example, the new plans for the Great Belt link assume private financing with government guarantees, based on toll charges. The Channel Tunnel is based on private financing via the Eurotunnel company as a consortium of banks, while revenues will be (autonomously determined) fares, user contributions and complementary service delivery. The Mont Blanc tunnel is a multi-national toll road run by a French-Italian consortium including central, regional and local governments, insurance companies, banks and other private financiers, where the toll level is regulated by the governments. Finally, the Dartford bridge over the Thames is a private sector initiative governed by a public sector concession, where the toll level is fixed by the government and where a ceiling has been

agreed upon for the maximum amount of private profit.

It turns out that the willingness of private financiers increases if the link has a **(semi-) monopoly character** (e.g., the Channel Tunnel, the Mont Blanc tunnel etc.), so that the risks of competing infrastructure investments in the area are much lower. Furthermore, in many cases there is a strong public sector involvement, in the form of either a **guarantee for debts** incurred by the private actors or an **approval of the tariff structure and level.** Furthermore, the **ownership** of much infrastructure rests in many cases still with public actors.

5. Lessons

It is clear that infrastructure is a **special network capital** which cannot simply be provided by the private sector. Infrastructure has **major strategic economic, social, financial and environmental effects**, which cannot solely be dealt with private initiatives.

It is noteworthy that **the interest of the private sector is different from that of the public sector**, so that not only the fare system, but also the design and expansion of new infrastructure will differ for these two institutional regimes. In section 2 it has been argued that the government may have different socio-economic grounds for a public involvement in infrastructure planning, construction, maintenance and operation. The experiences in section 3 and 4 have shown however, that public versus private involvement in infrastructure is not a 0-1 case, but one with many variations which may be different per mode, country and budget cycle.

It may be helpful to make a clear distinction between financing and exploitation in public-private sector involvement. This is indicated in table 1.

		financing	
		Private	Public
exploitation	Private	I	II
	Public	III	IV

Table 1. Different focus of public-private sector involvement

The first category (I) refers to a situation where infrastructure is regarded as a normal good with normal market prices. There is no public

intervention. The airline sector in the US is an example of this possibility.

The second category (II) refers to many new situations concerning railway companies. It has the advantage that the infrastructure will be efficiently managed, while the government has to pay only the fixed infrastructure costs and not the fluctuating exploitation costs.

The next category (III) concerns a situation where the private sector finances the infrastructure, but where the public sector is charged with the exploitation costs. This may be an appealing short-term budget solution, but is in the long run more expensive.

Finally, category IV is a common situation in conventional road and waterway infrastructure. Financing and exploitation is under control of the government.

In principle, infrastructure might be offered and managed via the **private sector**, but then **various conditions** have to be met, such as incorporation of social costs of transport, due consideration to equity objectives (e.g., isolated regions or mobility-deprived people), a fully operating cost-covering price system in the transport sector with equal competitive opportunities for all modes etc.

A major problem in infrastructure is its **long gestation period**, so that the risks for private financiers are fairly high and a fair return is not ensured. Such risks may include inter alia: political risks (public interventions, nationalisation), financial risks (interest fluctuations, inflation), construction risks (delays, rise in construction costs), operational risks (accidents) and commercial risks (false market expectations). This means in practice that the government has to provide in most cases financial guarantees for private financing (e.g., in the French autoroute or the Swedish railway system).

The **charge structure for the use of infrastructure** is an issue fraught with many problems. In principle, it would make sense to employ a **marginal cost principle**, so that all external (social) costs including congestion, environmental decay and lack of safety are incorporated in the user contribution. In that case the potential user will only start a trip with a certain mode, if his

marginal benefits are higher than (or equal to) his marginal (social) costs. In practice however, this system is not easy to implement as knowledge on costs and benefits (private and social) is limited, the price sensitivity of infrastructure users of certain modes is rather inert, and the indivisibility of transport infrastructure may easily generate overcapacity which has to be financed in any case. As a consequence, a uniform and unambiguous system of private financing of infrastructure cannot be developed. **Private financing is a customized activity with still a fairly high public sector intervention.** Nevertheless, various experiences have convincingly demonstrated the validity of private sector initiatives in infrastructure policy, such as the new Swedish railway system, the re-organisation of British Rail, or the operation of the French autoroutes.

It is clear that government plans to **shift high-risk infrastructure investment to the private sector** will necessarily lead to the request for higher profit margins and shorter pay-back periods. Hence, risk assessment is critical for private sector involvement. Joint private-public risk sharing may then become an option; risk transfer and revenue transfer are essentially two sides of the same medal.

In light of all above mentioned uncertainties for private sector involvement in infrastructure investments, it is clear that a **solid concession agreement** has to be made between all partners involved which specifies all rights, duties, risks and guarantees during the time trajectory of the project. This also concerns complementary goods provision, such as associated civil works, industrial areas etc. An interesting option which is at present being discussed in the Netherlands is the so called **revolving fund**, where revenues from Dutch natural gas exploitation are used to finance infrastructure expansions with the aim to pay the costs back on the basis of a user charge, so that in the future infrastructure charges will be fed back in this infrastructure fund.

A final issue is the **liberalisation of the transport market in the EC**, The strive for deregulation and competition will also have implications for financing European infrastructure (cf. Henry, 1993). In the mean time it has also been recognized that several institutions which would have to operate on a

European network basis (e.g., railway companies, telecommunication companies) are fairly reluctant to give up part of their national competence. This leads in practice to extremely complicated financing schemes for transnational infrastructure, as is witnessed by the expansion of the French TGV from Paris, via Brussels to Amsterdam. This also explains the need for a European infrastructure fund which might be helpful in overcoming unnecessary national stumbling blocks. Because transnational infrastructure is meant for commercial attractive long distant traffic, such a fund might be (partly) financed by private financiers. It is in any case evident that a failure to develop an appropriate framework for private sector initiatives in European infrastructure will seriously erode the opportunities of the emerging European network economy.

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